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SPRING MOTHS (MACROHETEROCERA) of a NATURAL AREA IN NORTHEASTERN KANSAS

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While attending the University of Kansas, between 1958 and 1961, I had the opportunity for considerable (but sporadic) moth-collecting during the spring semesters of 1959, 1960, and 1961. The results are presented in the annotated list that follows. Most of the collecting was restricted to the University of Kansas Natural History Reservation, 7 miles NE of Lawrence, Douglas County, Kansas, at approximately 900 feet elevation. A limited amount of collecting took place in a garden, at one address (1212 Louisiana St.) in Lawrence, Kansas.

BIOTIC DESCRIPTION OF THE RESERVATION

The following is quoted from a paper by Henry S. Fitch (1957) on "The Univ. of Kansas Natural History Reservation — Objectives and Uses": "Natural areas preserving samples of the original flora and fauna in an undisturbed state are almost completely lacking in Kansas; therefore, this reservation created in 1948, will have increasing usefulness and significance as it reverts to an approximation of its original condition, and as other areas that are not protected are further altered by agricultural and industrial uses."

Prior to 1948, the area had been used chiefly for grazing.

The Natural History Reservation, excluding the Rockefeller Tract, covers almost one square mile (590 acres), at elevations between 900 and 1100 feet. Most of the slopes, ravines, and lower areas are heavily wooded, with American elm, oaks, and hickory predominating. Some of the relatively flat hilltops are covered by grassland, and are thought to be remanants of bluestem prairie, which once dominated larger areas. The habitats represented on the Univ. of Kansas Natural History Reservation have been described in some detail by Fitch (1952, 1958), and by Fitch and McGregor (1956). These papers include not only descriptions of the Reservation as a whole, but also some detailed descriptions of specific small areas, and a discussion of the past history of the area in general.

For the purposes of this paper, it would be of interest to list (alphabetically) the woody plants growing on the Reservation, as they typify the undisturbed woodland habitat of the area. Of course herbaceous plants (both forbs and grasses) are abundantly represented by numerous species, particularly in the open areas, along roadsides and trails, in disturbed places, around the pond, and in the forest understory. For nearly complete coverage of the higher herbaceous plants (except grasses) of eastern Kansas, see Stevens (1948).

Woody Plants Growing on the Natural History Reservation
(Common species starred; dominant species double-starred)

Acer negundo
Ailanthus altissima (scarce)
Amorpha fruticosa
Asimina triloba
Carya ovata **
Celastrus scandens *
Celtis occidentalis *
Cercis canadensis **
Cornus asperifolia **
Crataegus mollis **
Euonymus sp.
Fraxinus americana *
Gleditsia triacanthos **
Gymnocladus dioica *
Juglans nigra *
Juniperus virginiana (the only coniferous plant present)
Lonicera sp.
Maclura pomifera **
Morus rubra *
Parthenocissus quinquefolia *
Platanus occidentalis (scarce)
Populus deltoides
Prunus americana
Prunus serotina
Pyrus ioensis **
Quercus macrocarpa (scarce)
Q. marilandica
Q. muehlenbergii **
Q. prinoides *
Q. rubra (scarce)
Q. stellata (scarce)
Q. velutina *
Rhus spp. *
Ribes sp.
Rosa sp.
Salix nigra * (at the pond, near Reservation headquarters, along with three other *Salix* spp.)
Sambucus canadensis
Smilax spp. *
Symphoricarpos orbiculatus **
Tilia americana (scarce)
Ulmus americanus ** (the commonest tree, but now in the process of dying off)
U. rubra
Vitis vulpina *
Zanthoxylum americanum

Fitch & McGregor (1956) discuss 29 of the above-listed woody plants, with reference to their ecology and occurrence on the Reservation.

TOPOGRAPHY

The collecting station was near the head of a small valley at about 920 feet elevation. Another somewhat larger valley is in the eastern part of the Reservation. The two valleys are separated by a relatively flat hilltop 1040 to 1060 feet in elevation; the hilltop has shallow soil with an underlying layer of hard rock of Pennsylvanian age, the Oread Limestone, and for the most part has a grassland type of vegetation. The slopes between the valleys and hilltop are steep and wooded, with thorny thickets dominated by honey locust, osage orange, and other xeroseral vegetation on the south-facing slopes, but with more mesic woodland including oaks, hickory, and ash, on the north-facing slopes. Much of the woodland is of recent origin, having encroached onto former grassland areas since prairie fires were eliminated.

METHODS OF COLLECTING

Except for the diurnal moths, and those species listed for Lawrence, Kansas, all were collected around the Reservation headquarters buildings, where they were attracted to several 15-watt black lights (ultraviolet tubes – F15T8/BL, without filters). These lights were placed against white walls, or white sheets, about six feet above the ground. No traps were used. Three of the lights faced rather dense woodland edge and streamside habitats, at the south and east edges of a relatively clear area where the buildings stand. Two other lights faced north and northeast toward a rather large, open, grassy field, bordered by woodland. A small pond, with characteristic vegetation, was approximately 200 yards to the northeast.

The lights were turned on sporadically, whenever time was available, during suitable weather from the first mild nights in late March up to the end of May each spring, from 1959 to 1961. On no occasion were the hours between 1 to 5 A.M. sampled. Rarely was it possible to collect on more than three nights per week, and it was not possible to continue this study beyond the end of May each year. It should be emphasized that collecting was restricted to *one* location on the Natural History Reservation. Even though the survey was restricted to this extent, some 226 species of moths were turned up, representing 12 families of the "Macrolepidoptera," and considerable information was gained on the relative abundance of these moths during the spring months.

Collecting in the city of Lawrence turned up a few species that were never encountered at the Reservation; these species are included in the list, but with the comment "to be looked for at the Natural History Reservation." As might be expected, there were numerous species taken at the Reservation, with its varied native flora, that were never seen in Lawrence.

Extensive daytime collecting at the Reservation was also carried out, during April and May, in favorable weather.

INTRODUCTION TO THE ANNOTATED LIST OF SPECIES

The families follow the arrangement in Part I of the *Check List of Lepidoptera of Canada and the United States of America* by J. McDunnough (1938). The genera and species are arranged *adphabetically,* within each family, for ease of locating the species in this list. (The McDunnough number are included however, at the right markin of the page, opposite the name of the moth). If a question-mark precedes a specific name, this indicates that there is some doubt as to the correct identity of the species; where there is considerable doubt ,no specific name is included. Occasional subspecific names are included. In most cases, no mention is made of mere color forms.

Following (1), is given the *flight-period* of the adult, as recorded within the limits of this spring survey. "Early" (preceding the month) indicates the period from the first through the 10th of the month; "mid" indicates the period from the 11th through the 20th; "late" indicates the period from the 21st through the 31st. The word "diurnal" is included, in the few cases where it applies. The last item after (1) is the *abundance-rating* which I have given to the moth, based on its occurrence at the Univ. of Kansas Natural History Reservation during the period of March through May, in 1959, 1960, and 1961. The relative abundance of the moth is expressed by the letter A, B, or C, as follows:

A = abundant.

B+
B = moderate abundance (neither notably common or rare).
B–

C = scarce (6 or fewer records for all three years combined).
C_1 = only *one* record during the entire survey; complete date given.

"B+" (= approaching "A") and "B–" (= approaching "C") are intended to show an inclination either *towards* abundance or scarcity; but the species is still better placed within the "B" category. Little use is made of these "B+" and "B–" ratings, as they imply rather fine differences in relative abundance, which can hardly be ascertained during a short period of time, with only sporadic and limited collecting. Some of the species placed in the "C" category may actually be commoner, but it would take more (and consistent) collecting to indicate this, if it is the case. Other "C– rated" species are scarce in the spring, as they are just beginning to emerge in late May; but in some cases, these moths become increasingly abundant during June, and perhaps later in the summer. However, in this paper, their abundance-ratings are derived strictly from their occurence during March, April, and May, and do not imply abundance for the year as a whole. Of course, some of the "C – rated" species are, indeed, truly scarce! But the possible complications should be kept in mind.

There is little likelihood of error with those placed in the "A" category, as this degree of abundance is quite apparent to the collector within a two or three year period at the same locality.

Some of the very earliest species to appear (*i.e.* – late March – April) are single-brooded only, and will not fly again until the following spring. Thus, their flight-periods are completely covered by this survey, and abundance-ratings are probably more accurate for these early species.

Following (2), occasional foodplants are listed, but only when they are known to be the plants eaten by the larvae of these moths at the Univ. of Kansas Natural History Reservation. General information on the foodplants of many of these moths may be found in the writings of Forbes (1920 - 1960), Jones (1951), Crumb (1956), Holland (1905), Peterson (1959), and J. H. Comstock (1950).

Following (3), are *miscellaneous remarks,* which may refer to the adult or to the early stages (*i.e.* – variability; pecularities in behavior; short notes on the early stages; anything distinctive or worth noting). Under many species, (2) and/or (3) are not included.

MISCELLANEOUS REMARKS

The specimens collected during this spring survey of the Univ. of Kansas Natural History Reservation are chiefly in the author's collection, and in the Snow Entomological Collection, at the University of Kansas. Some are in the Los Angeles County Museum, and in the collection of W. R. Bauer and J. S. Buckett (Davis, California).

The following is a listing of the total numbers of species collected per family:

1.	Sphingidae	10	7.	Noctuidae	121
2.	Citheroniidae	1	8.	Notodontidae	18
3.	Saturniidae	2	9.	Lasiocampidae	2
4.	Amatidae	1	10.	Drepanidae	1
5.	Arctiidae	13	11.	Geometridae	55
6.	Agaristidae	1	12.	Epiplemidae	1

(*TOTAL* species .... 226)

More extensive and consistent collecting, over a period of several consecutive years (covering all months of the year), and sampling the various habitats on the Reservation, would perhaps bring the total to somewhere between 300 and 400 species of "Macroheterocera." Inclusion of the "Microlepidoptera" would probably add another 200 (or more) species, and inclusion of the butterflies and skippers would probably add another 70 - 80 species to the total for the order Lepidoptera occuring on the Reservation.

It is of interest to note the preponderance of scarce, uncommon, or only moderately common moths in this list. The Reservation is characterized by a moth fauna that is rich in number of species, but relatively few of these species are particularly abundant. This condition is usually seen in undisturbed woodland habitats, where successional changes (in the plant associations) are slow, and the plant species are many; it should become increasingly the case at the Reservation, as it continues to be protected from disturbance. Woodland and forest associations (other than those of mostly coniferous trees) usually have a rich moth fauna, with relatively few of the moths reaching great abundance; this is even more clearly demonstrated in cases where the trees and shrubs are of numerous species, none of which is overwhelmingly common. (Tropical rain forests are an outstanding example of this condition, having *great numbers of species* — both plants and animals — but individuals of most of the species being uncommon or widely-scattered).

The following species (known to occur on the Reservation) have been preserved in the author's collection of preserved early stages of Lepidoptera, and are catalogued under the code-numbers given in parentheses. SPHINGIDAE: *Celerio lineata* (Sp. 4), *Cressonia juglandis* (Sp. 13), *Deidamia inscriptum* (Sp. 1), *Hemaris diffinis* (Sp. 2),*Isogramma hageni* (Sp. 5), *Smerinthus jamaicensis* (Sp. 6); CITHERONIIDAE: *Adelocephala* *bicolor* (Ci. 1); SATURNDIIAE: *Actias luna* (St. 1), *Telea polyphemus* (St.2); AMATIDAE: *Scepsis fulvicollis* (Am. 1); LITHOSIIDAE: *Hypoprepia fucosa* (Li. 1); ARCTIIDAE: *Diacrisia virginica* (Ar. 11), *Ecpantheria deflorata* (Ar. 8), *Estigmene acraea* (Ar. 2), *Euchaetias egle* (Ar. 7), *Haploa lecontei* (Ar. 1), *Isia isabella* (Ar. 10); AGARISTIDAE: *Psychomorpha epimensis epimenis* (AS. 1); NOCTUIDAE:*Acronycta oblinita* (N. 20), *Caenurgina crassiuscula* (N. 18), *Catabena lineolata* (N. 11), *Heliothis zea* (N. 4), *Ipimorpha sp.* (N. 27), *Marathyssa inficita* (N. 30), *Orthosia garmani* (N. 26), *O. ? alurina* (N. 2), *Palthis angulalis ?* (N. 57), *Rhodophora gaurae* (N. 16), *Schinia trifascia* (N.15), *Simyra henrici* (N. 22), NOTODONTIDAE: *Cerura sp.* (Nd. 11), *Heterocampa umbrata* (Nd. 3), *Melalopha inclusa* (Nd. 2), *Nadata gibbosa* (Nd. 9), *Schizura ? ipomoeae* (Nd. 13); LASIOCAMPIDAE: *Epicnaptera americana* (La. 4); GEOMETRIDAE: *Abbotana clemataria* (G. 2), *Anavitrinella pampinaria* (G.24), *Biston cognataria* (G. 25), *Calothysanis amaturaria* (G. 15), *Catopyrrha coloraria* (G. 13), *Palaeacrita vernata* (G. 1), *Plagodis phlogosaria* (G. 33).

Many (but not all) of the above preserved inmatures were collected on or near the Natural History Reservation. In most cases, at least the last instar larva was preserved, and for some the complete life history was preserved (all stages and all larval instars).

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THE ANNOTATED LIST OF SPECIES

I. Family SPHINGIDAE

Ampeloeca myron Cram. (1) Late Apr. - May; B (779)

Celerio lineata Fabr. (799) (1) Late Apr. - May; B-

Ceratomia sp. (——) (1) May 13, 1961; C_1

Cressonia juglandis A. and H. (744) (1) Mid-late May; C (2) *Juglans nigra* (3) Seems to be more abundant in the city of Lawrence than on the Natural History Reservation.

Deidamia inscriptum Harr. (782) (1) Late Apr. - early May; B (2) *Vitis*, *Parthenocissus* (3) This is the earliest and smallest nocturnal sphingid. Most specimens came in at dusk, or just after. The maximum number taken in one evening (at light) was 20 (Apr. 28, 1959). Only three were seen in 1960 (May 2), and none in 1961. The period of flight is short, lasting only about two weeks (at the most), and the moth is only single-brooded. It appears to be quite cyclic from year to year. The larvae were abundant in May 1959, nearly stripping some of the Virginia Creeper vines that climb on tree trunks in the woods. Under these conditions, the larvae did not attempt to hide themselves. They were also common on wild grape, but harder to find by casual searching. A peculiar habit which the larva has (especially when young), is to throw its head clear back, thus pointing the true legs upward; at the same time it usually spits a droplet of fluid. This odd posture is assumed as a reaction to disturbance, and is quite the opposite of the usual sphingiform position.

Hemaris diffinis Bdv. (770) (1) Apr. - May; diurnal only; A (2) *Symphoricarpos orbiculatus*, on the Reservation. (3) This is the earliest sphingid. The moth is sometimes attracted to redbud (*Cercis*) blossoms. The larva bears a caudal horn, like many other sphingids, and also has the general appearance of a "typical" sphingid larva. (fig. 1, photograph of a last instar larva). It has a distinctive mode of locomotion, best described as hesitant, and "forward-inching", which allows it to move inconspicuously along, without drawing much attention to itself. Most of the time, it is quiet, and blends in rather well with the foodplant. The easiest way to obtain *Hemaris* larvae is to collect the eggs, which are laid singly on the undersides of leaves, as the female moth hovers over the plant. Only an instant is needed for oviposition. Although the foodplant is abundant on the Reservation, the moths show a preference for ovipositing on plants which are in certain types of situations, as follows: (a) single plants, growing in open sunny places, or along roadsides; (b) groups or short rows of plants, growing in sunny clearings in the woods, or at the bases of limestone outcroppings (in the sun). The moths seem to avoid ovipositing on plants that form the shaded understory, where *Symphoricarpos* grows abundantly beneath trees.

Isogramma hageni Grt. (705) (1) May; A (2) *Maclura pomifera* (3) The larvae can be found on Osage orange, in the late summer. They were more common on small trees, out in open grassy fields near the Reservation headquarters. An unusual feature of the larval behavior is that they readily let go of the plant and drop if disturbed; most sphingid larvae hang on tenaciously when disturbed.

Paonias myops A. and S. (742) (1) Early - mid May; B-

Smerinthus jamaicensis Dry. (739) (1) May 20, 1961; C1 (2) *Ulmus americana* (3) The single specimen was reared from a larva collected in September, 1960, by Mrs. Fitch, near the Reservation headquarters.

Sphinx ? drupiferarum A. and S. (730) (1) May; B-

II. Family CITHERONIIDAE

Adelocephala bicolor Harr. (849) (1) Late Apr. - mid May; B+ (2) *Gleditsia triacanthos* (3) As is the case with quite a few of the moths in this list, a summer brood follows. The first individuals (in spring) have deep gray forewings, whereas most of the summer brood moths have tan (or light golden-brown) forewings; the difference in general appearance is striking.

III. Family SATURNIIDAE

Actias luna L. (811) (1) Late Apr. - early May; B+ (2) *Juglans nigra* (3) Fifteen individuals came to light on Apr. 28, 1959; this was a maximum count for any single night.

Telea polyphemus Cram. (812) (1) Late Apr. - May; B (2) *Quercus*, etc.

IV. Family AMATIDAE

Scepsis fulvicollis Hbn. (871) (1) May; diurnal and nocturnal; B- (2) *Bromus* and other grasses (3) Although not common in the spring, it is abundant in Sept., on *Solidago* blossoms; it is also more common at light in late summer. A larva was collected on *Bromus*, in Sept., 1960. The hairy larva could be mistaken for an arctiid, but there are no strictly grass-feeding arctiids in this locality.

V. Family ARCTIIDAE

Apantesis arge Dru. (1038) (1) Late Apr.; C_1

Apantesis nais Dru. (1058) (1) May; B

Apantesis phalaerata Harr. (1061) (1) May; A (3) No females were ever taken at the lights. Color and maculation are quite variable on the hindwings, and to a lesser degree on the forewings.

Cycnia ? inopinatus Hy. Edw. (992) (1) May; C

Cycnia tenera Hbn. (991) (1) May; B

Diacrisia virginica Fabr. (=*Spilosoma*) (1065) (1) Late Apr. May; A (3) This is the first arctiid to appear in the spring.

Estigmene acraea Dru. (1070) (1) May; C

Euchaetias egle Dru. (1001) (1) Late May; larvae were collected in Lawrence (in Sept.) and the adults emerged the following May; to be looked for at the Natural History Reservation (2) on *Gonolobus*, in Lawrence.

Euchaetias oregonensis Stretch (1005) (1) May; C

Halysidota tessellaris A. and S. (984) (1) May (one specimen collected in Lawrence; to be looked for at the Natural History Reservation).

Haploa lecontei Guer. (1103) (1) Late May; diurnal and nocturnal; B+ (3) The moths are highly variable, from immaculate white to white heavily marked with chocolate-brown on the forewings. The nearly mature larvae are common in early May, especially west of the Rockefeller Tract, where they climb into Ceanothus Ovatus, Symphoricarpos, small box elders, and other plants, to feed and sit in the sun.

Hyphantria cunea Dru. (1075) (1) May; A (3) This species is highly variable in maculation, from immaculate white to heavily-spotted with black. It is the smallest white arctiid in this locality.

Isia isabella A. and S. (1069) (1) May; C (3) This species is more abundant in open fields and roadside habitats, where the familar hairy larvae (banded in black, rust-brown, and black) are seen crawling over the ground in Sept. - Oct. After overwintering as mature larvae, they spin cocoons in the early spring and emerge in May and June.

VI. Family AGARISTIDAE

Psychomorpha epimenis Dru. (2864) (1) Apr.; diurnal only; B (2) Vitis, Parthenocissus (3) This moth is on the wing just as the buds are beginning to swell and open, in early spring. It is fairly common on mild, sunny days. Although not often inclined to alight, it sometimes comes down to drink on damp or wet ground. Numerous eggs were obtained from a confined female, by feeding her daily and giving her some filtered sunlight each morning, along with sprigs of foodplant. A preference was shown for ovipositing on or under the stipules of the leaves.

VII. Family NOCTUIDAE

Acontia aprica Hbn. (3203) (1) May: C

Acronycta connecta Grt. (1167) (1) Early May; C (3) A melanic specimen was captured.

Acronycta ? hastulifera A. and S. (1149) (1) Early May; C

Acronycta impleta Wlk. (1201) (1) Late Apr. - early May; A (3) As in some other Acronycta spp., melanic individuals are common.

Acronycta longa Gn. (1207) (1) May; B-

Acronycta morula G. and R. (1181) (1) Early May; C (3) This species is much more common in the town of Lawrence.

Acronycta oblinita A. and S. (1215) (1) Mid Apr. - early May; B (3) The bristly, colorful black and yellow larvae are sometimes common on Polygonum (in roadside ditches, etc.) in Sept.

Acronycta paupercula Grt. (1169) (1) Late Apr. - early May; B (3) This species is more common in Lawrence.

Agriopodes teratophora H.-S. (2582) (1) mid - late May; C

Agrotis ypsilon Rott. (1435) (1) Late Apr.; B

Amathes c-nigrum Linn. (1511) (1) May; C

Anagrapha falcigera Kby. (3252) (1) Apr. - mid May; B

Anepia capsularis Gn. (1804) (1) Early - mid May; C

Anorthodes tarda Gn. (2651) (1) May; B-

Argyrostrotis anilis Dru. (3458) (1) May; C

Autographa biloba Steph. (3279) (1) May; B (3) This species is more common in Lawrence.

Baileya australis Grt. (3240) (1) Early - mid May; A

Baileya dormitans Gn. (3241) (1) Early - mid May; C

Baileya ? ophthalmica Gn. (3239) (1) May 2, 1959; C_1

Balsa malana Fitch (2669) (1) May; B+ (3) More common in 1959 than in 1960 or 1961.

Bendis detrahens Wlk. (3527) (1) Early - mid May; C (3) This species is more common in Lawrence.

Bleptina caradrinalis Gn. (3797) (1) May; B (3) This species is more common in Lawrence.

Bomolocha albalienalis Wlk. (3691) (1) Mid May; C

Bomolocha bijugalis Wlk. (3689) (1) Mid - late May; C (3) Sexual dimorphism is noticeable in this species.

Bomolocha sordidula Grt. (3694) (1) Mid May; C

Caenurgina crassiuscula Haw. (3430) (1) Apr. - early May; diurnal and nocturnal; A

Caenurgina erechtea Cram. (3431) (1) Late Apr. - May; diurnal and nocturnal; B-

Catabena lineolata Wlk. (2737) (1) Apr. - early May; C (2) Verbena sp.

Cerastis tenebrifera Wlk. (1495) (1) Early - mid Apr.; B

Cerma cora Hbn. (2559) (1) One collected in Lawrence, May 12, 1961; to be looked for at the Natural History Reservation.

Chamyris cerintha Treit. (3131) (1) One collected in Lawrence, May, 1960; to be looked for at the Natural History Reservation.

Chorizagrotis auxiliaris Grt. (1387) (1) Late Apr. - early May; B

Chytolita morbidalis Gn. (3766) (1) Mid May; C

Cissusa spadix Cram. (3539) (1) Mid-late Apr.; C

Crambodes talidiformis Gn. (2661) (1) Late Apr. - early May; B

Crocigrapha normani Grt. (1950) (1) Apr. - early May; B+ (3) The peak of flight lasts only a week or less.

Delta ramosula Gn. (2589) (1) Mid - late Apr.; C

Diptergia scabriuscula L. (2587) (1) May 12, 1959; C_1

Elaphria festivoides Gn. (2647) (1) May; B

Elaphria grata Hbn. (2650) (1) Late Apr. - May; A

Erastria bellicula Hbn. (3117) (1) May; C

Erastria carneola Gn. (3124) (1) May; B (3) This species is more common in Lawrence.

Erastria muscosula Gn. (3118) (1) Mid - late May; C

Erastria musta G. and R. (3123) (1) May 18, 1959; C_1

Erastria synochitis G. and R. (3120) (1) May; B

Epizeuxis americalis Gn. (3734) (1) Mid May; C (3) May be more common than indicated, as members of this genus are not readily attracted to lights, and they often leave after coming in.

Epizeuxis lubricalis Geyer (3746) (1) Late May; C (3) Adults vary considerably in size.

Euagrotis illapsa Elk. (1483) (1) May; C

Euclidia cuspidea Hbn. (3426) (1) May 5, 1960; diurnal only; C_1 (3) At first glance, the diurnal adult (when on the wing) could be mistaken for a skipper of the genus Erynnis (dusky-wings), but the skippers have a more erratic, darting flight.

Euparthenos nubilis Hbn. (3414) (1) May 11, 1961; C_1

Eupsilia morrisoni Grt. (2305) (1) Mid Feb. - early Apr.; B-

Eutolype electilis form depilis Grt. (——) (1) Mid - late Apr.; B+ (3) This species was fairly common in 1961, but not in 1959 or 1960.

Eutolype grandis Sm. (2194) (1) Late Mr. - early Apr.; B (3) The period of flight lasts only a few nights, but the moth is not uncommon during the limited period that it is on the wing.

Faronta diffusa Wlk. (1962) (1) Late Apr. - early May; B

Galgula partita Gn. (2666) (1) Apr. - May; B (3) This species is more common in Lawrence. Its color is quite variable, from pale tan to rich, dark brown.

Heliothis zea Boddie (corn-ear worm) (2932) (1) May; C

Himella intractata Morr. (1840) (1) Early - mid Apr.; B

Homohadena infixa Wlk. (2153) (1) May 28, 1959; C_1

Homorthodes lindseyi Benj. (1890b) (1) May 18, 1959; C_1

Hypena humuli Harr. (3706) (1) Early - mid Apr.; C

Hypsorophora hormos Hbn. (3611) (1) One collected in Lawrence, May 26, 1959; to be looked for at the Natural History Reservation.

Isogona tenuis Grt. (3643) (1) Mid - late May; B-

Lacinipolia anguina Grt. (1716) (1) Mid May; C

Lacinipolia renigera Steph. (1738) (1) May; B (3) Although common in 1959, it was scarce in 1960 and 1961.

Lascoria ambigualis Wlk. (3805) (1) May; C (3) Sexual dimorphism is notable; the male has a cleft forewing, but the female does not.

Legna perditalis Wlk. (3685) (1) One collected in Lawrence, May 25, 1959; to be looked for at the Natural History Reservation.

Leucania phragmitidicola Gn. (1978) (1) May, especially early May; B-

Leucania ursula Fbs. (1974) (1) May; B

Leuconycta diphteroides form *obliterata* Grt. (2576) (1) Mid - late May; C

Lithophane antennata Wlk. (2242) (1) Apr. 6, 1960; C_1

Marathyssa inficita Wlk. (3223) (1) May 13, 1960; C_1 (2) *Rhus trilobata*

Matigramma pulverilinea Grt. (3506) (1) Mid May; C

Melipotis indomita Wlk. (3549) (1) May 23, 1960; C_1

Melipotis jucunda Hbn. (3551) (1) One collected in Lawrence, mid May, 1960; to be looked for at the Natural History Reservation.

Mocis texana Morr. (3435) (1) May; B

Morrisonia confusa Hbn. (1904) (1) Apr. - early May; C

Morrisonia distincta Hbn. (1671) (1) Late Apr. - early May; B+

Neoerastria apicosa Haw. (3126) (1) May 18, 1959; C_1

Ogdoconta cinereola Gn. (2773) (1) May; C

Orthodes crenulata Butl. (1871) (1) May 18, 1959; C_1

Orthosia alurina Sm. (1941) (1) Apr.; A

Orthosia garmani Grt. (1938) (1) Early - mid Apr.; A (3) The flight period is extremely short, with the moths at a "peak" for only one or two nights, at which time they are abundant. Largest numbers were seen on April 4, 5, and 6, 1959 and April 11, 1960. Larvae, reared from eggs, proved to be general feeders on various woody plants, including *Ulmus* and *Cornus*.

Orthosia hibisci Gn. (1943) (1) Apr.; A

Orthosia rubescens Wlk. (1937) (1) Apr.; B-

Palthis angulalis Hbn. (3807) (1) May; B (3) This species is more common in Lawrence. At the Natural History Reservation, larvae (Sept. - Oct.) were feeding on the dead, dried, papery seed capsules of *Lobelia syphilitica*, which they closely match in coloration. The larvae are quite inactive, and slow in their movements, resting quietly on the stem below the empty seed capsule, or on the capsule itself. They are multiple-brooded, and have been recorded from many other foodplants. See Comstock and McFarland (1961).

Panopoda carneicosta Gn. (3535) (1) May 28, 1959; C_1

Panopoda refimargo Hbn. (3534) (1) May 21, 1960; C_1 (3) As is the case with quite a few of the moths listed for *late* May only, *P. rufimargo* is barely represented as its flight is just starting, but it becomes more abundant in June.

Parallelia bistriaris Hbn. (3422) (1) One collected in Lawrence, mid-May, 1959; to be looked for at the Natural History Reservation.

Peridroma margaritosa Haw. (1946) (1) Late Apr. - early May; B+

Perigea xanthioides Gn. (2610) (1) Mid May; C

Phalaenophana pyramusalis Wlk. (3750) (1) May; C

Phalaenostola larentioides Grt. (3769) (1) May 28, 1959; C_1

Phiprosopus callitrichoides Grt. (3639) (1) May 24, 1961; C_1

Phoberia atomaris Hbn. (3545) (1) Late Mar. - mid Apr.; A

Phosphila miselioides Gn. (2549) (1) Mid - late May; C

Plathypena scabra Fabr. (3705) (1) Mid May; B

Platysenta vecors Gn. (2620) (1) Late Apr. - early May; B

Platysenta videns Gn. (2613) (1) Apr. - May; B+

Plusia aerea Hbn. (3296) (1) One collected in Lawrence, May 25, 1959; to be looked for at the Natural History Reservation.

Plusiodonta compressipalpis Gn. (3612) (1) Late Apr. - early May; B (3) This moth is more common in Lawrence.

Polia adjuncta Bdv. (1691) (1) May 23, 1960; C_1

Prodenia ornithogalli Gn. (2678) (1) Late Apr. - early May; C

Proxenus miranda Grt. (2662) (1) Mid - late May; B (3) The forewings have a distinct glossy sheen.

Psaphida grotei Morr. (2191) (1) Early - mid Apr.; B

Pseudaletia unipuncta Haw. (1994) (1) Late Apr. - May; A

Psychomorpha epimenis (see AGARISTIDAE)

Pyrrhia umbra Hufn. (2715) (1) A few collected in Lawrence, late May; to be looked for at the Natural History Reservation.

Raphia abrupta Grt. (1140) (1) Late Apr. - mid May; B+

Salia interpuncta Grt. (3731) (1) May 11, 1961; C_1

Sericaglaea signata French (2298) (1) Mid - late Apr.; C

Simyra henrici Grt. (1222) (1) Late Apr.; C (3) One of the colorful, bristly larvae was collected on *Sorghum*, in a roadside ditch (early Oct.).

Spiloloma lunilinea Grt. (3595) (1) Mid - late May; B-

Stiriodes obtusa H.-Sch. (2832) (1) May 28, 1959; C_1

Tarachidia candefacta Hbn. (3176) (1) Mid May; C

Tarachidia erastrioides Gn. (3172) (1) Mid - late May; B

Trachea delicata Grt. (2547) (1) May 11, 1961; C_1 (3) The forewings are marked with olive green, which often discolors in the killing jar.

Trichoplusia ni brassicae Hbn. (3269) (1) Late Apr. - early May; C

Ulolonche culea Gn. (1831) (1) May; C

Xanthoptera nigrofimbria Gn. (3113) (1) Mid - late May; B- (3) As is the case with some of the other species listed, this moth is abundant later in the year, although uncommon in its spring brood.

Zale galbanata Morr. (3478) (1) Apr. - May; C

Zale ? minerea Gn. (3484) (1) Late May; C

Zanclognatha cruralis Gn. (3762) (1) Collected in Lawrence, mid-late May; to be looked for at the Natural History Reservation.

VIII. Family NOTODONTIDAE

Dasylophia anguina A. and S. (3880) (1) May 13, 1960; C_1

Gluphisia septentrionalis Wlk. (3939) (1) May; B-

Heterocampa bilineata Pack. (3908) (1) May; C

Heterocampa guttivitta Wlk. (3907) (1) Early - mid May; C

Heterocampa sp. (——) (1) May 23, 1959; C_1

Heterocampa umbrata Wlk. (3902) (1) May 29, 1960; C_1 (3) This single record is from a pupa, collected under a log (Oct.), about 5 mi. WSW of the Natural History Reservation. A female emerged on the date given above.

Hyperaeschra georgica H.-S. (3845) (1) May 14, 1959; C_1

Lophodonta angulosa A. and S. (3854) (1) One collected in Lawrence, late May; to be looked for at the Natural History Reservation.

Melalopha albosigma Fitch (=*Ichthyura a.*) (3827) (1) Mid Apr. early May; B

Melalopha apicalis Wlk. (3822) (1) May 4, 1959; C_1

Melalopha inclusa Hbn. (3825) (1) Early - mid May; B (3) A number of larvae were collected on *Populus* (in Sept.), near the Reservation headquarters; these emerged in May, 1961. The larvae are gregarious, in a web-nest of two or more leaves.

Misogada unicolor Pack. (3909) (1) Mid May; C

Nadata gibbosa A. and S. (3857) (1) May 11, 1961; C_1 (3) This moth was often seen in Lawrence.

Nerice bidentata Wlk. (3858) (1) Late Apr. - early May; B+ (3) The period of flight is rather short.

Oligocentria lignicolor Wlk. (3912) (1) May; C

Schizura apicalis G. and R. (3926) (1) Mid - late May; C

Schizura ipomoeae Dbldy. (3920) (1) May 21, 1960; C_1

Schizura unicornis A. and S. (3924) (1) Late Apr. - mid May; C

IX. Family LASIOCAMPIDAE

Epicnaptera americana Harr. (3999) (1) Apr. - early May; B

Heteropacha rileyana Harv. (3998) (1) Apr.; B+ (3) The peak of abundance lasts only a few nights. Only two or three females came to the lights during the entire survey.

X. Family DREPANIDAE

Eudeilinea herminiata Gn. (4017) (1) May; C (3) There are pure white geometrids for which this moth could be mistaken.

XI. Family GEOMETRIDAE

Abbotana clemataria A. and S. (5199) (1) Apr. - early May; B+ (2) *Fraxinus*, etc. (fig. 2, photograph of a last instar larva).

Anacamptodes defectaria Gn. (4915) (1) Mid - late Apr.; C

Anavitrinella pampinaria Gn. (4908) (1) Late Apr. - May; A

Apicia confusaria Hbn. (5184) (1) Fairly common during mid - late May, in Lawrence; to be looked for at the Natural History Reservation.

Bapta vestaliata Gn. (4606) (1) Late Apr. - May; duirnal and nocturnal; B+ (3) As this small geometrid is pure, shining white, it is very conspicuous when flying in the daytime.

Biston cognataria Gn. (4968) (1) May 24, 1961; C_1

Calothysanis amaturaria Wlk. (4205) (1) Mid - late May; B- (2) *Rumex crispus* (3) The very unusual dark brown larvae are considerably swollen in the thoracic region. They make no attempt to hide on their foodplant, and are easily collected by searching.

Catopyrrha coloraria Fabr. (4642) (1) Late Apr. - mid May; diurnal and perhaps nocturnal; B+ (2) *Ceanothus ovatus* (3) This moth was encountered only in a grassland-field, directly NW of the Natural History Reservation, in places where *Ceanothus* was growing amongst the grasses. In this restricted habitat, for a short period, it was rather common. The moth rests on the ground, with its wings up over its back. It flies up when approached, but lands again, a short distance away. The behavior is reminiscent of *Sericosema* spp. A large number of larvae were reared from eggs in 1961. Although offered many different plants from the habitat, they accepted only *Ceanothus*.

Chlorochlamys chloroleucaria Gn. (4095) (1) Late Apr. - mid May; B

Cleora sublunaria Gn. (4876) (1) Apr. - mid May; A

Coryphista meadi Pack. (4248) (1) Two records for early May, 1959, in Lawrence; the moth might occasionally turn up at the Natural History Reservation, although its only recorded foodplant is *Berberis* (=*Mahonia*).

Deilinia quadrifasciaria Pack. (4611) (1) May 28, 1959; C_1

Dichorda iridaria Gn. (4082) (1) May; C

Dyspteris abortivaria H.-S. (4234) (1) May; B-

Ectropis crepuscularia Schiff. (4946) (1) Mid Apr. - early May; B

Enconista dislocaria Pack. (= "*Semiothisa*" *d.*) (4703) (1) Late Apr. - early May; B

Euacidalia sericeata Pack. (4109) (1) Mid - late Apr.; C (3) This is the smallest spring geometrid collected on the Natural History Reservation.

Euchlaena pectinaria D. and S. (5003) (1) Late Apr. - mid May; C

Eugonobapta nivosaria Gn. (4991) (1) May; C (3) This moth is of the same size and color as *Eudeilinea herminiata* Gn., a drepanid, which also occurs on the Natural History Reservation.

Eumacaria latiferrugata Wlk. (=*Itame l.*) (4774) (1) Mid Apr. mid May; C

Euphyia centrostrigaria Woll. (4559) (1) Late Apr. - May; B

Eupithecia herefordaria C. and S. (4310) (1) Apr. - May; B+

Eupithecia swetti Grossb. (4354) (1) Apr. - May; B

Haematopis grataria Fabr. (4204) (1) Collected during May, in Lawrence; to be looked for at the Natural History Reservation. (3) Remarks under *Xanthoptera nigrofimbria* (Noctuidae) apply here, as well as to a number of the other geometrids listed.

Heterophleps refusata Wlk. (4231) (1) May; C

Heterophleps triguttaria H.-S. (4233) (1) Mid - late May; C

Horisme intestinata Gn. (4393) (1) Abundant in Lawrence, in mid to late May; to be looked for at the Natural History Reservation.

Hydriomena pluviata Gn. (4477) (1) One collected in Lawrence, Apr. 26, 1960; to be looked for at the Natural History Reservation.

Hyperetis amicaria H.-Sch. (5043) (1) Late Apr. - May; B-

Lobocleta ossularia Hbn. (4115) (1) One collected in Lawrence, in mid May; to be looked for at the Natural History Reservation.

Lycia ypsilon S. A. Forbes (4952) (1) Apr.; A (3) The moth reaches a peak of considerable abundance in one or two nights, and then rapidly disappears until the following April. On Apr. 6, 1959, over 200 individuals came to one light. No females were ever taken at the lights.

Melanolophia signataria signataria Wlk. (4857) (1) Apr. - early May; A (3) The maculation is somewhat variable.

Mellilla xanthometata Wlk. (4657) (1) Apr. - May; sometimes on the wing in the daytime, although primarily nocturnal; A

Metanema inatomaria Gn. (5054) (1) Mid - late May; C

Metarranthis duaria Gn. (5050) (1) Early - mid May; C (3) This moth may be more common than indicated, as individuals have a tendency to leave the immediate vicinity of the light after once flying in.

Metarranthis ? homuraria Grt. (5046b) (1) Mid May; C

Palaeacrita merriccata Dyar (4961) (1) Early Apr.; C

Palaeacrita vernata Peck (4960) (1) Jan. - Mar. - Apr. - mid May; A+ (2) Ulmus americanus, U. rubra, etc. (3) The males occasionally come to lights (on mild nights) in Jan. and Feb., and they become extremely abundant in March and April. Periodically, the larvae of this moth defoliate the elms, shortly after they leaf out, but the trees usually recover (with a secondary crop of leaves) by late May, at which time the larvae have dropped to the ground to pupate.

Percnoptilota obstipata Fabr. (4535) (1) Mid Apr. - May; B- (3) Sexual dimorphism is notable.

Pero ? honestarius Wlk. (5072) (1) Apr. - early May; B

Phigalia olivacearia Morr. (4956) (1) Apr. (particularly early Apr.); B

Phigalia titea Cram. (4958) (1) Apr. (particularly early Apr.); A

Philobia aemulataria Wlk. (4665) (1) Late Apr. - early May; B

Plagodis phlogosaria Gn. (a spring form) (5040) (1) Late Apr. - mid May; C

Scopula inductata Gn. (4158) (1) Mid - late May; C

Scopula limboundata Haw —— (1) Mid - late May; B (3) The maculation is variable.

Semiothisa continuata Wlk. (4710) (1) May; C

Semiothisa gnophosaria Gn. (4738) (1) Mid - late May; C

Semiothisa ocellinata Gn. (4723) (1) May; C

Synchlora aerata Fabr. (4070) (1) Two specimens collected in Lawrence, in late May; to be looked for at the Natural History Reservation.

Tetracis crocallata Gn. (5197) (1) Mid - late May; B

Tornos abjectarius calcasiata C. and S. (——) (1) Mid Apr. - mid May; B-

Tornos scolopacinarius scolapacinarius Gn. (4812) (1) Mid Apr. mid May; B

Xanthotype ? sospeta Dru. (5007) (1) Mid - late May; B- (3) This moth is more common in Lawrence, although not abundant.

Xystrota rubromarginaria Pack. (4134) (1) Apr. - mid May; diurnal and nocturnal; A (3) This is a common diurnal spring geometrid on the Reservation, but it also comes to lights after dark.

XII. Family EPIPLEMIDAE

Callizzia amorata Pack. (5223) (1) May; C

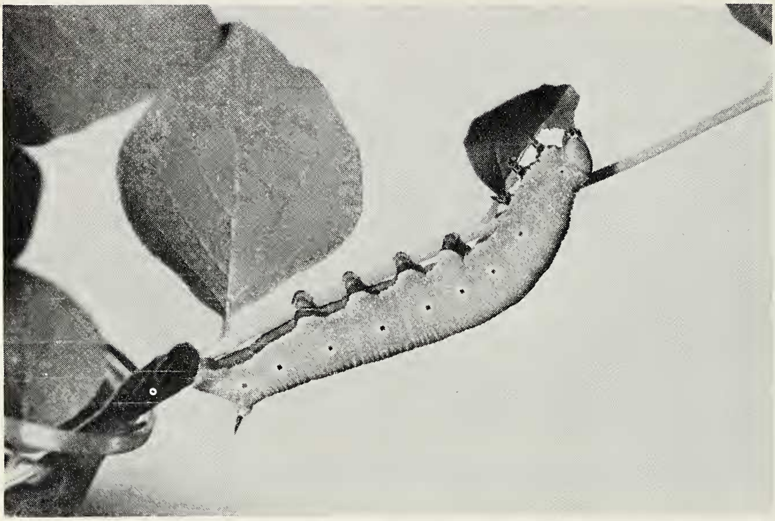

Fig. 1—*Hemaris diffinis* (last instar, alive and feeding) on foodplant, *Symphoricarpos orbiculatus.* Univ. Kansas Nat. Hist. Res., 7 mi. N.E. Lawrence, Douglas Co., Kansas. May, 1960. Reared from egg.

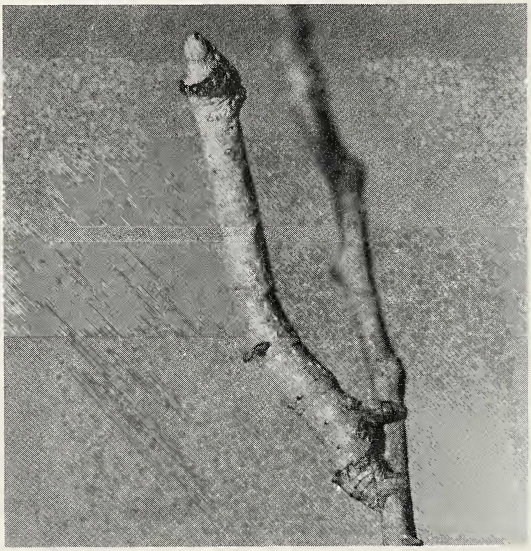

Fig. 2—*Abbotana clemataria* (Geometridae), last larval instar, alive. Reared from egg on *Fraxinus* at Lawrence, Douglas Co., Kansas. A general feeder on many trees and shrubs.